

1 **REVISITING THE KULESHOV EFFECT WITH FIRST-TIME VIEWERS**

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Researchers have recently suggested that historically mixed findings in studies of the Kuleshov effect (a classic film editing-related phenomenon whereby meaning is extracted from the interaction of sequential camera shots) might reflect differences in the relative sophistication of early vs. modern cinema audiences. Relative to experienced audiences, first-time film viewers might be less predisposed and/or able to forge the required conceptual and perceptual links between the edited shots in order to demonstrate the effect. The current study recreates the conditions that traditionally elicit this effect (whereby a neutral face comes to be perceived as expressive after it is juxtaposed with independent images: a bowl of soup, a gravestone, a child playing) to directly investigate and compare “continuity” *perception* in first-time and more experienced film viewers. Results confirm the presence of the Kuleshov effect for experienced viewers (explicitly only in the sadness condition) but not the first-time viewers, who failed to perceive continuity between the shots.

Key words: Kuleshov effect, continuity perception, artificial landscape, first-time viewers, naive viewers

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71 Revisiting the Kuleshov Effect With First-Time Viewers

72 The Kuleshov effect is a film editing effect demonstrated during the late 1910s and
73 early 1920s by the Russian pioneering filmmaker and theorist Lev Kuleshov (1899–1970).
74 Famously, Kuleshov is reported to have intercut a close-up of the Russian actor Mozhukin’s
75 neutral, expressionless face with various other camera shots, including a bowl of soup, a
76 woman in a coffin and a child playing with a toy bear. He observed that these additional shots
77 interacted with the original, leading viewers to perceive the (objectively neutral) face as
78 expressing happiness, sadness, and hunger/thoughtfulness respectively (Pudovkin 2007). As
79 the years have passed, the reliability and validity of this effect have come into question. The
80 original footage used by Kuleshov is long-since lost and superficial issues with the design of
81 the experiments¹ have prompted some to re-classify it as part of the “mythology of film”
82 (Holland 1989) or “folklore of the cinema” (Pearson and Simpson 2005). Yet this disapproval
83 may be unwarranted.

84 Despite the somewhat anecdotal nature of Kuleshov's original observations, other
85 (more rigorous) studies provide converging evidence that a single film scene can generate a
86 profoundly different perceptual meaning for viewers when placed in different contexts.
87 Goldberg (1951) for example, found that the emotional quality and intensity of a fearful face
88 accompanied by a scream can differ depending on the order of camera shots, e.g., it can come
89 to be perceived as rage or even joy. Similarly, studies by Kuiper (1958) and Foley (1966)

¹ It has been both (conflictingly) reported that Kuleshov found a long strip of film with Mozhukhin's close-up and used it for his experiment (Levaco, 1974, p.8); and that he purpose filmed Mozhukhin, with the instruction to appear expressionless (Messaris, 1994, p.16).

90 demonstrated that neutral faces can be perceived as happy or sad, depending on their context
91 in films (as cited in Isenhour 1975). Support has also come from psychological studies
92 utilizing brain imaging (Mobbs et al. 2006) and eye tracking (Aviezer et al., 2008;
93 Barratt, Rédei, Innes-Ker, and van de Weijer, 2016) techniques during the viewing of edited
94 film clips. Mobbs and colleagues (2006) observed differential neural responses (e.g., in the
95 bilateral temporal pole, superior temporal sulcus and anterior cingulate cortices) when
96 identical faces were paired with different emotionally salient contextual movies. At the end of
97 the scanning session, they also asked their subjects to judge the faces. Despite faces being
98 identical, attributions of facial expression and mental-state were altered when they were
99 juxtaposed with contextual movies of different valance. Aviezer and colleagues (2008)
100 reported that the pattern of participants' eye movements to facial regions changed
101 systematically as a function of the affective context in which these images appeared.

102 The most recent replication (and extension) of the Kuleshov experiment was
103 conducted by Barratt and colleagues (2016) and concluded that “some sort of Kuleshov effect
104 does in fact exist” (p.865). These authors considered the original film sequences to be an
105 instance of point-of-view editing, so carefully constructed their set of test stimuli to encourage
106 participants to infer that the glance shot and the object shot were spatially related, i.e., the
107 gazer did not look directly into the camera. Their results confirmed that the emotional context
108 influenced participants' judgments of the target face stimulus in each of the five emotional
109 conditions (happiness, sadness, hunger, fear, and desire), with the most pronounced effects for
110 sadness.

111 Importantly, however, previous replication attempts have been less successful. Prince
112 and Hensley (1992) found that the majority of their subjects reported seeing an actor with a
113 neutral expression (i.e., no editing-induced appearance of emotion), regardless of the

114 sequence into which his face was edited. These authors suggested that the “naiveté of early
115 cinema audiences”, compared with their more experienced, modern participants (university
116 undergraduates), might explain the original findings.

117 To our knowledge there has been no empirical study of the Kuleshov effect with naive
118 participants. However, there have been anecdotal reports (Forsdale & Forsdale, 1970) and
119 direct investigations of their perception of other aspects of editing (e.g., Hobbs et al., 1988;
120 Schwan & Ildirar, 2010). Hobbs and colleagues (1988) compared single shot recordings with
121 edited versions of the same content and reported no effect of editing on comprehension in first
122 time viewers. Crucially however, more recent studies with first-time viewers (Schwan &
123 Ildirar ,2010; Ildirar & Schwan, 2014; Ildirar, Levin, Schwan and Smith, 2014) have found
124 that participants’ familiarity with the depicted content can powerfully modulate this effect. In
125 their studies, first-time viewers struggled to construct a spatiotemporal relationship between
126 adjacent shots (e.g., shot reverse shot, outdoor to indoor shot). Instead, they perceive adjacent
127 camera shots as independent images unless there is an ongoing line of actions viewers are
128 familiar with, a salient gaze cue or clear dialogue. Given that the film clips historically used in
129 Kuleshov experiments do not include any such cues (relying instead on participants
130 connecting the shots together through emotion), it remains an open question whether this
131 editing effect will help naive viewers to perceive a spatiotemporal relationship between the
132 adjacent shots. In order to answer this question, we conducted a field experiment that
133 attempted to elicit the Kuleshov effect with a unique sample of first-time film viewers from
134 regional Turkey, and a comparison group from the same region.

135 (Figure 1 around here)

136

137 **Kuleshov-Type Sequence as an Instance of Artificial Landscape**

138 There are two components to the Kuleshov effect: perception of spatiotemporal
139 continuity between the juxtaposed camera shots and perception of a change in emotion of the
140 target (neutral) face. Although the first component is a critical prerequisite for the latter, it is
141 rarely directly considered or discussed in any detail. An exception is David Bordwell, Kristin
142 Thompson and Jeremy Ashton’s consideration: They call the Kuleshov effect any series of
143 shots that in the absence of an establishing shot prompts the spectator to infer a spatial whole
144 on the basis of seeing only portions of the space. Here the authors describe artificial landscape
145 without naming it.

146 While shooting his film *The Project of Engineer Prite* (1918), Kuleshov discovered
147 that it was possible to create a cinematic terrain that exists nowhere in reality. This was the
148 first of several properties of montage he described in his later articles and books. His film
149 required shots of actors looking at electrical cables strung on poles that had not been filmed.
150 Kuleshov supposed that the same effect could be achieved by splicing shots of actors looking
151 off-camera with separately recorded shots of the row of poles. Since the poles and the actors
152 were in different parts of Moscow, Kuleshov termed the effect the “artificial landscape” (also
153 known as “creative geography”) (Kuleshov 1974). After this discovery, Kuleshov, created
154 other *artificial landscapes* in his movies. For example, he presented scenes in which actors
155 walked up the steps of a well-known Moscow building to then arrive at The White House in
156 the USA. In one film he even combined close up shots of different women’s body parts to
157 create a “new” woman. In this way, he created cities, buildings and bodies that existed only
158 on screen.

159 Artificial landscape is a ubiquitous feature of modern film and television. For
160 example, when two characters are shown in single shots looking right and left respectively
161 (usually in dialogue scenes) viewers readily assume that they are filmed in the same place at

162 the same time, though this may not have been the case. A well-known example is dialogue
163 between David Bowie and Marlene Dietrich in *Just a Gigolo* (1978), which was filmed with
164 these actors individually, in separate rooms, months apart. It is interesting to note that
165 although the viewers of *Just a Gigolo* did not realize this production trick and perceive the
166 shots in a spatiotemporal continuity, first-time film viewers were not similarly fooled
167 (Schwan & Ildirar, 2010; Ildirar & Schwan, 2014). These naïve viewers saw people in the
168 same place but not at the same time, i.e. thinking that the second person comes after the first
169 one leaves.

170 **Kuleshov-Type Sequence as an Instance of Point-of-View (POV) Shot**

171 Another master of editing, Alfred Hitchcock, noted that the primary editing structure
172 of his film *Rear Window* (1954) was based on the Kuleshov effect. In the film, James
173 Stewart's character (Jeff) is a voyeur, peeking through his window into people's private lives.
174 In the framing of the shots, Hitchcock consistently kept his POV shot aligned with Stewart's
175 eyeline. Since Stewart often has an emotionally ambiguous face during the film, the views out
176 of his apartment window powerfully drive the emotional context (Truffaut, 1984, pp. 213–
177 223). In an interview, Stewart later claimed not to remember playing the role the way he had
178 seen it on-screen. Thus it appears that Hitchcock's manipulation of the Kuleshov effect was so
179 successful, he was able to alter the montage to create completely different meanings (Scharff,
180 1997).

181 From this perspective, a Kuleshov-type sequence can be considered as an instance of
182 point-of-view (POV) shot, which is a short film scene that shows what a character (the
183 subject) is looking at (represented through the camera). Viewers link these two images
184 together in their minds and perceive them as they are depicting a continuous instance -
185 concluding that the person is looking at the object.

186 The POV shot is one of the techniques film makers discovered in the early years of
187 cinema, which helps viewers to integrate diverse views separated by cuts, in other words to
188 perceive continuity through film cuts. One proposed explanation of how viewers perceive
189 cinematic continuity in spite of the spatio-temporally discontinuous nature of the visual
190 information presented to them is that the films produce a stream of audiovisual information
191 that is similar to our veridical perception of real scenes and events (e.g., Munsterberg,
192 1916/1970; Anderson, 1998; Bordwell, et al., 1985; Cutting, 2005; Gibson, 1979; Lindgren,
193 1948).² In line with this ecological view of film cognition, explaining how a POV (point-of-
194 view) shot is easily comprehended by viewers, Noël Carroll (1993) and Tim J. Smith (2012)
195 argue that it mirrors natural attentional shifts between a looker and an object. Gaze following
196 (looking where someone else is looking) emerges in infancy as early as 6 months of age to
197 targets within a baby's own visual field (D'Entremont, Hains & Muir, 1997) and within the
198 first year to targets more broadly (Butterworth & Jarrett, 1991; Corkum & Moore, 1998). By
199 12 months, infants will turn to see what another is looking at (Tomasello, Kruger, & Ratner,
200 1993). Adults, however, spontaneously monitor a person's eyes and use gaze direction to
201 support inferences about his or her intentions, emotions, attention, knowledge states and
202 likely future actions. Indeed, although other cues such as head orientation, body posture, or
203 even pointing gestures may also provide important information in the determination of where
204 gazers are directing their attention, the information from gaze cues have been shown to be
205 exceptionally powerful (Perrett et al., 1992). The location of objects in the proximity of the
206 viewer can also influence interpretation of gaze direction (Lobmaier et al., 2006) however in a
207 Kuleshov-type sequence, these are unlikely to influence responses unless participants
208 perceive spatio-temporal continuity between the adjacent (gazer, object) shots.

² Please see Smith, 2012, Smith, Levin and Cutting, 2012; Smith, 2012 and Ildirar & Schwan, 2014 for further discussions about perception of continuity in films.

209 (Figure 2 around here)

210

211 According to Noël Carroll (1993) the fact that a head movement is replaced with an
212 edit does not matter because ‘it is the endpoints of the activity, and not the space between,
213 that command our attention’ (Carroll, 1993, p. 128). Per Persson (2003) develops this theory
214 by describing the POV structure as an instance of deictic gaze or joint visual attention.
215 According to Persson (2003), in a POV scenario, the presentation of the object involves an
216 unnatural ‘jump’ from one optical perspective/camera position to another. He suggests some
217 conditions to increase the likelihood for the viewer to make a ‘POV inference’, and the first
218 of these conditions is that the gazer should not look directly into the camera (cf. the so-called
219 ‘fourth wall’ rule)³. Perhaps crucially, the original Kuleshov sequences do not follow such
220 suggestion. Moreover, since the present study aims to replicate the original sequences as
221 closely as possible, in our core stimuli the gazer will look directly into the camera.

222 The technique of direct address—when a character looks to the audience - is rare in
223 fictional cinematic discourse except in instances of comedy (Renov, 2004, p.30). However,
224 this technique has become increasingly popular with documentary film makers since the
225 1990s. It is believed to stand-in for eye-contact in daily life and increase the sense of intimacy
226 as well as confrontation (Rosenheim 1996, p.221). Interestingly, a study investigating
227 perceptions of credibility during testimony reported that witnesses who averted their gaze
228 were perceived to be less credible and were more likely to be associated with a guilty verdict
229 (Hemsley & Doob, 1978). Others have since also found that maintaining eye contact with an
230 interviewer facilitates deception detection (Vrij, Mann, Leal, & Fisher, 2010). It follows then,

³ Please see Barratt et. al., 2016 for the summary of the Persson’s theory.

231 that looking directly into the camera might have an effect (positive or negative) on perception
232 of continuity and emotion: both components of the Kuleshov effect.

233 **Kuleshov-Type Sequence as a Place for Emotion Seeds to Sprout**

234 In everyday life, face stimuli are rarely perceived in isolation and the context in which
235 they appear can be very informative. Researchers have explored three types of context effects
236 on facial emotion perception: (a) stimulus based context, in which a face is physically
237 presented with other sensory input that has informational value; (b) perceiver based context,
238 in which processes within the brain or body of a perceiver can shape emotion perception; and
239 (c) cultural contexts that affect either the encoding or the understanding of facial actions
240 (Barrett, Batja , and Gendron, 2011). The Kuleshov experiment deals with stimulus-based
241 context.

242 Emotion perception studies investigating the influence of stimulus-based context have
243 shown that facial expression judgments are influenced by any number of cues, including
244 descriptions of the social situation (e.g., Carroll & Russell, 1996), voices, body postures, and
245 visual scenes (e.g., Aviezer et al., 2008; Righart & de Gelder, 2008; for reviews, see Barrett,
246 Mesquita & Gendron, 2011 and de Gelder et al., 2006), and even other faces (e.g., Masuda et
247 al., 2008). For example, scowling faces (posed, exaggerated facial expressions of anger) are
248 more likely to be perceived as fearful when paired with a description of danger (Carroll &
249 Russell, 1996, Study 1) or disgusted when paired with a body posture involving a soiled
250 object (Aviezer et al., 2008, Study 1). Aviezer and colleagues (2008) propose a model of
251 context effects using the metaphor of “emotion seeds.” They suggest that the same
252 perceptual information might be shared by different facial expressions (i.e., emotion seeds)
253 and lie dormant in isolated faces, but be activated by appropriate context. If a given context
254 activates a facial expression that shares enough emotion seeds with the expression displayed

255 by a target face, these seeds will “sprout” and override the original expression of the target
256 face. By contrast, an equally powerful context will have little impact if its associated facial
257 expression shares few emotion seeds with the expression of the target face (Aviezer, 2008,
258 p.9). In case of naïve viewers viewing a Kuleshov sequence, we speculate that the sprout of
259 seeds might function to not only help them perceive an expression on an otherwise
260 expressionless face, it could also help them link the discontinuous shots.

261 **Method**

262 *Participants*

263 Forty participants (half female, 56–72 years old, $M = 64.1$ years) took part in the
264 study. All subjects gave informed consent and the study was approved by the Research Ethics
265 Committee of the University Hospital of Istanbul University. The experimental group (20
266 participants, half female, 58–72 years, $M = 66.4$ years) knew of the existence of television and
267 had some abstract ideas about it, but had no prior direct experience with the medium. This
268 group lived in small isolated houses in the mountains south of Isparta, Turkey that had only
269 recently been connected to the electrical grid. All these of participants had some photos
270 (mostly head shots of their children or grandchildren) and four had radios with a very limited
271 broadcast range. Many assumed that television is a “visual radio” with programs that showed
272 pictures of the people who speak or sing on the radio. Seven of the group was illiterate and
273 the average years of schooling was 1.95 years.

274 The control group (half female, 56–72 years, $M = 61.9$ years) were from a similar
275 geographic and cultural background as the experimental group. Critically, these participants
276 all had some experience with television. They spoke the same dialect and had a similar
277 lifestyle as the experimental group, but with a little more access to luxuries. Three of them
278 were illiterate and the average education level was 3.1 years. This control group was

279 significantly younger than the experimental group, $F(57,2) = 3.7, p = .03$, but there was no
280 significant difference in educational level, $\chi^2(4) = 4.48, p = .3$.

281 *Stimuli*

282 Two sets of video clips were produced, which each contained six two-shot sequences
283 of eight second durations (see Table 1). In Set A, each sequence started with an
284 expressionless man's face, which was followed by an image of a plate of soup, a gravestone,
285 and a little girl. In Set B, the sequences matched the structure of those in Set A, but here the
286 facial expression of each man matched the intercut images, i.e., he licked his lips and gulped
287 to express hunger (when preceding the soup image), looked sad (when preceding the
288 gravestone) and smiled (when preceding the little girl). Two versions of each set were created
289 featuring different actors. We independently validated perception of these expressions (i.e., as
290 showing someone neutral, hungry, sad, happy) with a large separate group of undergraduate
291 students ($n=80$). To replicate the conditions in Kuleshov's original experiment, in both clips
292 the actors looked directly into the camera, the sequences were grayscale and there was no
293 sound.

294 An additional sequence was produced during testing in the field following responses
295 from the first three experimental (naïve) participants that strongly signaled they were not
296 making any connections between the intercut images. In light of this, we made an alternate
297 version of the hunger sequence in Set A where the actor was replaced with a shot of an old
298 woman looking down and a plate of soup on a floor table, which is where these participants
299 tend to eat their own meals.

300 (Table 1 around here)

301

302

303 *Procedure*

304 Participants were tested individually in their homes in sessions lasting 30 - 60 minutes.
305 In order to check for possible auditory, visual, or cognitive deficits, participants were asked to
306 describe their present situation, i.e., what they could see outside the window. They were also
307 interviewed about their experience with and their knowledge about television and films. No
308 participants were excluded on the basis of these discussions.

309 After these questions, a laptop with a 17.3-inch display was presented to participants
310 (viewing distance ~ 60 cm). Participants were told that they would see something on the
311 display and be asked to describe it, as they had previously described their present (real-life)
312 situation. The video sequences were shown in a fixed order (as in Table 1) with a short break
313 after each presentation to answer questions from the experimenter. The first question was
314 always “Could you please tell me what you have seen?” If their answer clearly indicated an
315 understanding of spatiotemporal continuity and/or the Kuleshov effect (e.g., “I saw a man
316 smiling at the baby across him”) no further questions were asked regarding spatio-temporal
317 continuity perception. When the participants mentioned just one of the shots (e.g., “I saw a
318 man looking at me”), they were always asked what else they saw, which usually led them to
319 talk about the content of the other shot (e.g., “There was a man first. Then he disappeared and
320 there appeared a stewpan”). If the answer did not mention any connection between the shots
321 (e.g., “I saw a gravestone too”), follow-up questions were also asked (e.g. “Where was the
322 gravestone?”) until their perception of the edited sequence was clear. All the participants were
323 also asked how the person on the screen was feeling.

324 *Coding and Analysis*

325 All sessions were video recorded, transcribed and then double coded (reliability,
326 Cohen's kappa coefficient > .92) using the qualitative analysis program Atlas-ti. Each
327 participant's qualitative responses to each clip was numerically classified. When there was no
328 spatio-temporal linkage between the camera shots (i.e., no sense that the person in the first

329 shot was in the same place or time as the objects in the second shot) they received a score of
330 0. When they *did* make a clear spatio-temporal link between the shots they received a score of
331 1. When participants demonstrated a clear Kuleshov effect (i.e., perceived variation in the
332 (neutral) facial expression of the first shot when it interacted with the content in the second
333 shot) they received a score of 2. After the coding process, the data were transferred from
334 Atlas-ti to SPSS and differences in the frequencies between the first-time viewers and the
335 experienced viewers were tested for significance by Fisher's exact test.

336 **Results**

337 The percentage values reported below reflect participants responses averaged across
338 the two identities that appeared in Sets A and B. Differences in frequencies between the first-
339 time viewers and the experienced viewers were tested for significance using Fisher's exact
340 test.

341 (Table 2 around here)

342 Set A (neutral faces)

343 *First time viewers.* The first-time viewers interpreted all the sequences in Set A as
344 independent images. Responses in this group did not suggest any spatio-temporal linkage
345 between the shots or the existence of a Kuleshov effect on the perceived expression of the
346 neutral face. A typical response was that there was a man looking towards the viewer sitting
347 in silence that came and went. When asked what else they saw, participants commented that
348 the man disappeared and then something else appeared: a plate (often described as something
349 bigger, e.g., a cooking pot or saucepan), a gravestone, or a little girl. When asked additional
350 questions to probe their perception of these sequences, their responses revealed very limited
351 consideration of context or interaction between the shots. With regards to the perceived
352 spatial location of these objects (e.g when asked, "where was the plate/man?") they responded
353 that the plate "should be in the kitchen" or "on the stove" or "how can I know it? It appeared

354 there (pointing the screen)". When asked what the man was feeling or thinking, first time
355 viewers said that "they cannot know" that or "he was looking with empty eyes". When asked
356 "was the little girl alone?" all participants answered "yes" adding that they did not see her
357 parents next to her. The customized additional video clip added during testing, which featured
358 a face with directed gaze (looking in the direction of the soup) helped the first-time viewers
359 link the shots spatio-temporally. All of them reported that she was sitting at a floor table and
360 waiting. The reasons provided for her waiting were diverse and related mostly to the
361 individual backgrounds of the first-time viewers. For example, one female participant said
362 that the woman in the video clip was afraid of her husband's anger since she did not know if
363 he would like the meal. Given that these attributions regarding the woman's emotion were
364 elicited in a perceiver-based rather than a stimulus-based context, this was not considered
365 evidence of the Kuleshov effect.

366 *Experienced viewers.* In contrast to the first time viewers, 100% of the experienced
367 viewers constructed spatio-temporal links between the shots in the Set A sequences. A
368 Kuleshov effect was also observed for 55% of participants in the gravestone sequence.

369 For the soup sequence, 100% of participants reported that they saw a man with a meal
370 in front of him with many (65%) also making a forward inference and saying that the man
371 will eat the meal. When asked about how he was looking and feeling, 30% of participants said
372 that he looked indecisive and was thinking whether he should eat the meal and 45% of them
373 said that he was waiting for someone to start eating. The remaining 25% said "nothing
374 special...he will just eat the meal". Here the absence of motion through the cuts led the
375 viewers to seek an explanation for the two shots (i.e., the meal would be eaten by the actor).
376 This expectation may be explained by the dramatic principle called 'Chekhov's gun'. Here,
377 every element in a narrative is required to be irreplaceable (Bill, 1987). Thus just as whenever

378 you introduce a rifle in the first chapter it must go off in the second chapter (to give
379 Chekhov's example), it seems that if you show a meal in the first shot of an edited sequence it
380 must be eaten in the second shot.

381 For the gravestone sequence, 100% of experienced viewers made spatio-temporal
382 links between the shots and 55% demonstrated a Kuleshov Effect. That is, they all said that
383 the man was standing in front of a gravestone and when asked how he was feeling, 55% of
384 them said that he looked sad/sorry. Other responses were that he was praying
385 (15%) or keeping a minute of silence (20%), which might also be considered as interpretation
386 of sadness since these are what people do in memory of people died. Only 10% of
387 experienced viewers said that the person was feeling nothing.

388 For the child sequence, once again 100% of participants made spatio-temporal links
389 between the face and the second image. All of the experienced viewers reported that they saw
390 a man and a girl. When asked where they were, participants said that they must be at home or
391 at school. No participants showed a clear Kuleshov effect. Forty-five percent of participants
392 said that he felt "nothing", 20% said that he was miles away and thinking of something else.
393 Interestingly, 25% of participants linked this sequence with the gravestone sequence (that
394 preceded it) by saying that the man was trying to forget someone who had been lost by
395 thinking that the life goes on.

396 For the old woman sequence, all participants reported that she was waiting before
397 eating her meal. The reasons for waiting were several: allowing the meal to get cold (10%),
398 expecting someone to come (20%) or that she just did not have appetite (45%). The rest did
399 not make an explanation. When it was asked what she felt or thought, the most frequently
400 made interpretation was "who knows what problem she has". Just as for the other 'soup'
401 video clip (showing the man actor), however, no one inferred that she was hungry.

402 Set B (expressive faces)

403 *First time viewers.* Even with these emotion-congruent stimuli, first time viewers
404 rarely constructed any links between the camera shots. It was only for the graveyard sequence
405 that there was any evidence of any interaction. Critically, however, this did not constitute a
406 full spatio-temporal association. Rather, participants said that they thought the man was sorry
407 for his loss but did not seem to perceive him to be spatially located in the graveyard. When
408 they were asked where he was, he was not reported to be across or next to gravestone but
409 rather “here”, looking at us. When they were further probed regarding where the gravestone
410 was, participants responded that “it was gone”. In the other sequences, even this limited
411 interaction was not observed. For the soup sequence for example, participants described the
412 man to be licking his lips/gulping (0% said he looked hungry) and then said that the plate (or
413 pot/well/hole/pool) appeared “again”. When asked the reason for this man’s behavior, they
414 said that they cannot know it. For the child sequence, the two shots were also interpreted as
415 two independent pictures. The little girl and the man were said to be looking happy, but no
416 participants commented that they were together.

417 *Experienced viewers.* Descriptions of the soup, graveyard, playing child and old
418 woman (with directed gaze) sequences all indicated that 100% of experienced viewers made
419 clear spatio-temporal associations between these shots. Furthermore, most of these
420 participants perceived the emotions of the persons in the predicted manner: describing the
421 man as hungry in the soup condition (95% for Actor A and 100% for Actor B), sad in the
422 gravestone condition (100% for both actors) and happy in the child condition (100% for both
423 actors).

424 (Table 3 around here)

425

426 **Discussion**

427 The “Kuleshov Effect” reflects a conscious connection and subsequent interaction
428 between edited camera shots made by an observer. The camera shots used in the sequences
429 typically associated with this effect are not connected to each other with commonalities on a
430 perceptual level but rather through intentions, motivations and emotions. In other words, any
431 continuity between juxtaposed shots is an illusion created in the mind of a viewer and the
432 landscape in which both shots are located in is an artificial one: existing outside of reality.
433 The present study investigated whether first-time viewers construct spatio-temporal relations
434 between the shots like experienced viewers, i.e., forging a narrative connection between them
435 and conceiving of the artificial landscape created in the video clips. Here, we coded naïve and
436 experience viewers’ responses to classic Kuleshov experiment sequences in order to establish
437 whether or not there are differences in how first-time film viewers spontaneously connect
438 edited shots and generate the Kuleshov Effect.

439 The current study did not address different theories of emotion; the existence,
440 discreteness of specific emotions or other related topics⁴. A person’s ability to make sense of
441 facial expressions is affected by several factors, which we attempted to control as much as
442 possible with in the present study. Responses from the experienced viewer participant group
443 validated our chosen stimulus set. These participants all connected the shots on spatio-
444 temporal level and had no problem identifying the facial expressions used in the Set B
445 sequences. Moreover, even the first time viewers accurately categorized the emotions in the

⁴ For cutting edge theories of emotion, see (Moors et al. 2013) and for current debates on universality of emotion recognition see (Nelson and Russell 2013).

446 happiness and sadness conditions but not the hunger condition, which could reflect this latter
447 judgment not being one of the ‘basic’ or universal emotions.

448 Our results reveal that first-time viewers do not demonstrate either of the two key
449 components of the Kuleshov effect. Despite an intact ability to perceive and understand the
450 content of each shot, they perceived them to be wholly separate from each other and did not
451 relate them spatio-temporally. Even when the coherent facial expressions were juxtaposed
452 with the causes of such expressions, they still considered them as if they were independent
453 photographs: a visual format they are familiar with. First-time viewers do not seem to have
454 the notion of what constitutes a film, i.e., sequences of shots that are linked in coherent ways.
455 In the sadness condition, for example, they said that the person is sad because of someone he
456 had lost (in relation to the gravestone shot), but crucially there was no indication that they
457 thought that the sad person and the gravestone were in the same place at the same time. The
458 image of the person was not “here” any more as the image of gravestone. These results are
459 consistent with the results of a study for young children when looking at picture books
460 (Berman 1988) that suggest that once a page is turned, a new story begins. Berman (1988)
461 concluded that the narrative abilities that function to allow children to link such events are
462 constrained by broader development in cognition, expressive language abilities, and their
463 familiarity with narrative norms in a literate society.

464 Somewhat surprisingly, the customized additional video clip added during testing
465 revealed that first-time viewers *can* connect edited sequences spatio-temporally under at least
466 some conditions. For example, when a person’s gaze in the first shot is coherent with the
467 location of the depicted object in the second shot. Here, the eye-line match filmic equivalents
468 of joint attention (acquired in early childhood, e.g., (Moore and Dunham 2014) may have
469 provided an instance of a conceptual relation that was clear enough for even naïve viewers to

470 interpret. Eye-line matches, in other words, appeared to open the eyes of first-time viewers to
471 the artificial landscape created in the video clip. Unfortunately, there was no scope for
472 interpretation of the facial expression of the lady depicted because her face was not readable
473 (head and eyes were turned downwards) preventing evaluation of the second component of
474 the Kuleshov effect.

475 The ‘classic’ Kuleshov effect was clearly observed for experienced viewers only in
476 sadness condition. Here, participants reported that the man standing in front of the gravestone
477 was *sad* for his loss, although the footage showed the same neutral expression face that was
478 juxtaposed with the shots of soup and the little girl. It could be argued that the image of the
479 gravestone is much intense and salient than images of a plate of soup or a cute child playing.
480 This study, however, followed the procedures described in other studies of the Kuleshov
481 effect, for comparability with this previous work. It is possible that these participants’
482 interpretations of the emotional state of the faces shown before the plate of soup could also be
483 considered evidence of the Kuleshov effect in action. Although there was no clear attribution
484 of a specific emotional or mental state, the experienced viewers tried to find an explanation
485 for what caused the man to not eat the soup in front of him. Thirty percent of them said that
486 the man was unsure whether or not he should eat it, and forty-five percent thought he was
487 waiting for someone else.

488 When considering participants’ responses to the video sequences with the little girl, it
489 may be helpful to consider that viewing one facial expression can shift the wider scale of
490 judgment. That is, a strongly salient ‘anchor’ face can skew the emotion perceived in
491 subsequent faces in the opposite affective direction (Russell and Fehr 1987), making a neutral
492 face appear sad when presented after a happy face, or happy when presented after a sad face.

493 Thus, the happy face of the little girl in the test sequences might have biased participants
494 interpret the actor's facial expression to be relatively less happy, or even sad.

495 Prince and Hensley (1992) cited the naiveté of the early audiences as a possible reason
496 for discrepancies in the appearance of the Kuleshov effect with contemporary audiences. Our
497 results challenge this notion. They indicate that first time film viewers do not even link
498 intercut camera shots edited in sequence, let alone demonstrate the Kuleshov effect. We
499 propose, instead, that it is experienced viewers that are more likely to 'collaborate' with the
500 film-maker. That is, to try to understand their intentions and make sense of what they see
501 because they know that films are comprised of shots that come together to convey a narrative.
502 Such viewers contrast with naïve viewers who seem unaware of the existence of a film-maker
503 or a camera. It should be noted here that the experienced viewers in the present study (like the
504 first-time viewers) had no prior experience of taking part in research. Both participant groups
505 were first-time participants in a study and had no idea about what a *study* is. Even though the
506 experiment was explained, they supposed that they would simply watch videos without
507 realizing that they were purpose-made for research purposes.

508 It seems also worth mentioning here that the first-time viewers (mis)interpreted the
509 objects shown in close-up shots as things bigger than they really were (e.g. plate, hole) and
510 the people as sitting (only upper bodies were shown, in medium shots). These were also
511 evidence that the first-time viewers recruited for this particularly study had only a very basic
512 understanding of what film is. It was also interesting that neither first-time nor experienced
513 viewers made any comment on the black and white quality of the video clips. Further
514 research is needed to determine the role of such prior knowledge by explaining the concept of
515 film to first-time viewers. Further research is also needed to test the Kuleshov effect with
516 other images, e.g., those as perceptually salient as a gravestone, which might elicit stronger

517 emotions and modulate perception more powerfully. Direction of gaze and the order of the
518 shots have also been identified as key variables that should also be taken into account in such
519 work.

520 **Filmography**

521 Hemmings, D. 1978, Just A Gigolo, USA

522 Hitchcock, A. 1954, Rear Window, USA

523 Kuleshov, L. 1918, The Project of Engineer Prite, Russia

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Set A (neutral facial expression) ²	Set B (consistent facial expression) ²
	
	
	
	

Table 1. An overview of the two-shot sequences produced for this study. Each eight second sequence in Set A featured a face with a neutral facial expression and those in Set B featured an overt expression that matched the following image. Alternate versions of each sequence were created with a second actor. Set B included an additional sequence added in the field that was intended to more closely mirror the conditions in participants' lives (old woman looking down).

²

Film Sequence	Spatiotemporal continuity perception (%)			Kuleshov Effect perception (%)		
	Viewer			Viewer		
	Naïve	Experienced	Group comparison ^A	Naïve	Experienced	Group comparison ^A
Man + Soup	0	100	p<.001	0	0 (hungry) 30 (indecisive)	p=1 p= < .01
Man + Gravestone	0	100	p<.001	0	55	p<.05
Man + Baby	0	100	p<.001	0	0	p=1
Local Lady (looking down) + Soup	100	100	p=1	0	0	p=1

A. Fisher's exact test

Table 2: Perception of spatiotemporal continuity and the Kuleshov Effect across groups for the first set of film sequences: intercut faces with neutral expressions.

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Film Sequence	Spatiotemporal continuity perception (%)			Correct interpretation of depicted emotion (%)		
	Viewers			Viewers		
	Naïve	Experienced	Group Difference ^A	Naïve	Experienced	Group Difference ^A
Hungry man + soup	0	100	p<.001	0	95	p<.001
Sad man + gravestone	0	100	p<.001	100	100	p=1
Happy man + baby	0	100	p<.001	100	100	p=1

A. Fisher's exact test

Table 3: Perception of spatiotemporal continuity and the Kuleshov Effect across groups for the second set of film sequences: with edit-congruent facial expressions.

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Figure 1. Example of sequence from Ildirar and Schwan (2014).
First-time viewers could not construct a spatiotemporal
relationship between adjacent shots.

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Figure 2. Example of sequence from Ildirar and Schwan (2014). Salient gaze cue helped first-time viewers to construct a spatiotemporal relationship between adjacent shots.

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